REMARKS

Introductory Comments

Prior to this Amendment, claims 12, 17, 18, 45 and 59-67 were pending in the present application. By this Amendment, Applicant has amended claims 12, 17, 18, 45, 59, 61 and 63 as shown in the listing of the claims. Reconsideration of the application as amended and in view of the following remarks is requested.

CLAIM REJECTIONS

Claim Interpretation

The Examiner alleges intended use terms in several of the pending claims, and that "It has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations." If the Examiner believes this rejection is still applicable to the amended claims, Applicant respectfully requests that the Examiner provide exemplary language which the Examiner believes avoids this "intended use" rejection.

Applicant refers the Examiner to MPEP § 2173.05(f) which states: "A functional limitation must be evaluated and considered, just like any other limitation of the claim, for what it fairly conveys to a person of ordinary skill in the pertinent art in the context in which it is used." For example, a means-plus-function element is used in apparatus claims but typically has only functional limitations. Applicant respectfully requests that any limitation in the attached claims "be evaluated and considered, just like any other limitation of the claim, for what it fairly conveys to a person of ordinary skill in the pertinent art in the context in which it is used."

Claim Rejection under 35 U.S.C. § 112

The Examiner rejects claim 18 under 35 U.S.C. § 112, second paragraph, as being indefinite. In particular, the Examiner found the limitation, "source wavelength," to be unclear. Applicant amends claim 18 herein to remove the limitation of "source wavelength" and more clearly recite the subject matter being claimed. In view of the amendment to claim 18, Applicant respectfully requests that this rejection be withdrawn.

Claim Rejections under 35 U.S.C. § 103

Legal Standards

A claimed invention is unpatentable if the differences between it and the prior art "are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art." 35 U.S.C. § 103(a); see Graham v. John Deere Co., 383 U.S. 1, 14; 148 USPQ 459, 465 (1966). "The ultimate determination of whether an invention is or is not obvious is a legal conclusion based on underlying factual inquiries including: (1) the scope and content of the prior art; (2) the level of ordinary skill in the prior art; (3) the differences between the claimed invention and the prior art; and (4) objective evidence of nonobviousness." In re Dembiczak, 50 USPQ2d 1614, 1616 (Fed. Cir. 1999).

To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine its teachings with one or more additional sources. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined), must teach or suggest all the claim limitations. M.P.E.P. § 2143. Moreover, to establish a *prima facie*

case of obviousness, the Examiner must also demonstrate that there is an apparent reason to combine the known elements in the fashion claimed by the patent at issue (see KSR International Co. v. Teleflex Inc., 127 S.Ct. 1727; 82 USPQ2d 1385 (2007)). Even if each feature of a claim can be independently shown within the cited art references, this alone is insufficient to conclude that a claim is obvious in view of such art. *Id.* Instead, to render a claim obvious over a combination of cited references, an Examiner must provide "some articulated reasoning with some rationale underpinning to support the legal conclusion of obviousness." *Id.* Moreover, the Examiner must make "explicit" this rationale of "the apparent reason to combine the known elements in the fashion claimed," including a detailed explanation of "the effects of demands known to the design community or present in the marketplace" and "the background knowledge possessed by a person having ordinary skill in the art." *Id.* at 14. Finally, the Examiner cannot pick and choose among the individual elements of assorted prior art references to recreate the claimed invention to support an obvious rejection; rather, the Examiner has the burden to show some apparent reason or justification to combine the known elements in the fashion claimed by the patent at issue. *See Id.* and Smith-Kline Diagnostics, Inc. v. Helena Laboratories Corp., 8 U.S.P.Q.2d 1468, 1475 (Fed. Cir.1988).

Rejection under 35 U.S.C. § 103: Debreczeny in view of Virtanen

The Examiner rejected claims 12, 17, 18, 45 and 59-65 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 7,079,252 to Debreczeny et al. ("Debreczeny") in view of U.S. Patent No. 6,312,901 to Virtanen ("Virtanen").

Analysis

Debreczeny is directed to a Fourier Transform Infrared (FTIR) device that uses a

Michelson interferometer. A forward beam is passed through a sample and a backward beam (180^{o} out of phase with forward beam) is passed through a reference, the sample and reference beams are then combined optically or electronically, and the combined beam is used to determine the presence of an analyte. The Debreczeny device uses a stationary sample and reference. Virtanen is used in the rejection to show a CD-based analyte detection device. Even though Virtanen discloses a CD-based device, the CD is only used as a spatially addressable platform. A sample is deposited at a known location (address) on the CD, the CD is moved so that the known location (spatial address) of the sample is accessible by the probe beam and readings are taken at that specific location on the CD to determine the presence of the analyte. See for example, Virtanen, col. 10, line 65- col. 11, line 3, which states:

> Thus, patterned deposition of multiple signal elements on a single supporting member or substrate, coupled with use of a detector capable of addressing the spatial location of these individual signal elements, permits the concurrent assay of a single sample for multiple different analytes. (emphasis added)

and see col. 18, line 60- col. 19, line 7, which states:

> Subsequently, the disk can be scanned by a laser reader which will detect, through reflection, the presence of a microsphere or other reflective element at the various spatially predetermined locations. Based on the distance of the microsphere from the axis of rotation of the disk and the angular distance from an address line forming a radial line on the disk, the location of a particular metal sphere can be specifically determined. Based on that specific location and the predetermined locations of specific binding pairs as compared to a master distribution map, the identity of the bound material can be identified. Thus, in the foregoing manner it

is possible in one fluid sample to analyze for thousands, or even greater numbers, of analytes simultaneously.

Thus, both Debreczeny and Virtanen teach placing a probe at a specific known location, exposing the probe to a sample, then going to the known location of the probe, and then taking readings at that known location to examine the probe and determine characteristics of the sample.

Claims 12, 17, 18, 45, 59 and 60

In contrast to Debreczeny and Virtanen, claim 12 recites:

> a scanner on the signal path for ... producing a time modulated signal beam, the time modulated signal beam being modulated over time by the probe beam illuminating the plurality of repetitively spaced targets on the substrate in a sequential manner as the probe beam and the substrate are moved relative to one another, the time modulated signal beam traveling along the signal path;
>
> an adaptive optical element ... for combining a first portion of the time modulated signal beam and a first portion of the reference beam to form a first output beam which travels along the signal path and for combining a second portion of the time modulated signal beam and a second portion of the reference beam to form a second output beam which travels along the reference path;
>
> a reference path detector on the reference path for responding to the second output beam and generating a reference path signal; and
>
> a processing system for determining the presence or absence of the first analyte based upon the reference path signal.

Neither Debreczeny nor Virtanen, either alone or in combination, disclose "a time modulated

signal beam ... modulated over time by the probe beam illuminating the plurality of repetitively spaced targets on the substrate in a sequential manner as the probe beam and the substrate are moved relative to one another," nor do they disclose "an adaptive optical element ... for combining a first portion of the time modulated signal beam ... to form a first output beam which travels along the signal path and for combining a second portion of the time modulated signal beam ... to form a second output beam which travels along the reference path" as recited in claim 12. In addition, neither Debreczeny nor Virtanen, either alone or in combination, disclose "a reference path detector ... for responding to the second output beam and generating a reference path signal;" nor do they disclose "a processing system for determining the presence or absence of the first analyte based upon the reference path signal" where both the second output beam and the reference path signal are a function of a time modulated signal beam as recited in claim 12. For at least these reasons Applicant submits that claim 12 is patentable over Debreczeny in view of Virtanen. Claims 17, 18, 45, 59 and 60 depend on base claim 12 and recite additional limitations. According, Applicant respectfully requests that claims 12, 17, 18, 45, 59 and 60 be found allowable.

In addition, claim 18 recites "wherein the adaptive optical element adjusts a static relative longitudinal phase difference between the time modulated signal beam and the reference beam to be substantially in quadrature after passing through the adaptive optical element." Neither Debreczeny nor Virtanen, either alone or in combination, disclose an element that "adjusts a static relative longitudinal phase difference between the time modulated signal beam and the reference beam to be substantially in quadrature" as recited in claim 18. For this reason, in addition to the reasons provided above with regard to claim 12, Applicant respectfully requests that claim 18 be found allowable.

Claims 61-65

In contrast to Debreczeny and Virtanen, claim 61 recites:

> a scanner on the signal path ... to form a time modulated signal beam, the time modulated signal beam being modulated over time due to the relative motion of the probe beam and the substrate and due to the repetitively spaced targets on the substrate, the time modulated signal beam traveling along the signal path;
>
> an adaptive optical element on both the signal path and the reference path that combines a first portion of the time modulated signal beam ... to form a first output beam which travels along the signal path, and combines a second portion of the time modulated signal beam ... to form a second output beam which travels along the reference path;
>
> a signal path detector on the signal path responsive to the first output beam to generate a signal path signal;
>
> a reference path detector on the reference path responsive to the second output beam to generate a reference path signal; and
>
> a processing system that receives the signal path signal and the reference path signal and determines the presence or absence of the analyte based upon the signal path signal and the reference path signal.

Neither Debreczeny nor Virtanen, either alone or in combination, disclose "a time modulated signal beam ... modulated over time due to the relative motion of the probe beam and the substrate and due to the repetitively spaced targets on the substrate," nor do they disclose "an adaptive optical element ... that combines a first portion of the time modulated signal beam ... to

form a first output beam which travels along the signal path, and combines a second portion of the time modulated signal beam ... to form a second output beam which travels along the reference path" as recited in claim 61. In addition, neither Debreczeny nor Virtanen, either alone or in combination, disclose "a signal path detector ... responsive to the first output beam to generate a signal path signal;" nor do they disclose "a reference path detector ... responsive to the second output beam to generate a reference path signal;" nor do they disclose "a processing system that receives the signal path signal and the reference path signal and determines the presence or absence of the analyte based upon the signal path signal and the reference path signal" where the first and second output beams, the signal path signal and the reference path signal are each generated from a time modulated signal beam as recited in claim 61. For at least these reasons Applicant submits that claim 61 is patentable over Debreczeny in view of Virtanen. Claims 62-65 depend on base claim 61 and recite additional limitations. According, Applicant respectfully requests that claims 61-65 be found allowable.

In addition, claim 63 recites "the wavelength of the source beam is tuned to cause the signal beam and the reference beam to be in quadrature." Neither Debreczeny nor Virtanen, either alone or in combination, disclose tuning "the wavelength of the source beam ... to cause the signal beam and the reference beam to be in quadrature" as recited in claim 63. For this reason, in addition to the reasons provided above with regard to claim 61, Applicant respectfully requests that claim 63 be found allowable.

Rejection under 35 U.S.C. § 103: Debreczeny in view of Virtanen and further in view of Drevillon

The Examiner rejected claims 66 and 67 under 35 U.S.C. § 103(a) as being unpatentable

over Debreczeny in view of Virtanen and further in view of U.S. Patent No. 5,485,271 to Drevillon et al. ("Drevillon").

Analysis

Debreczeny and Virtanen are described above. Drevillion is directed to a dual modulation interferometric ellipsometer that uses a Michelson interferometer. The Drevillion reference is used by the Examiner to show an electro-optical modulator and a polarizer. Like Debreczeny and Virtanen, Drevillon discloses a stationary target 1 on a stationary target platform 5 (see Figs 1 and 2). Drevillon does disclose "a phase modulator 8, preferably photoelastic, in Zn.Se., which modulates the transmitted luminous flux at a frequency w." (col. 4, lines 25-27). However, like Debreczeny and Virtanen, Drevillon does not disclose a time modulated signal beam that is modulated over time due to the relative motion of a probe beam and a substrate with repetitively spaced targets.

Claims 66 and 67 depend on base claim 61. None of Debreczeny, Virtanen or Drevillon, either alone or in combination, disclose "a time modulated signal beam ... modulated over time due to the relative motion of the probe beam and the substrate and due to the repetitively spaced targets on the substrate," nor do they disclose "an adaptive optical element ... that combines a first portion of the time modulated signal beam ... to form a first output beam which travels along the signal path, and combines a second portion of the time modulated signal beam ... to form a second output beam which travels along the reference path" as recited in claim 61. In addition, none of Debreczeny, Virtanen or Drevillon, either alone or in combination, disclose "a signal path detector ... responsive to the first output beam to generate a signal path signal;" nor do they disclose "a reference path detector ... responsive to the second output beam to generate a reference path signal;" nor do they disclose "a processing system that receives the signal path

signal and the reference path signal and determines the presence or absence of the analyte based upon the signal path signal and the reference path signal" where the first and second output beams, the signal path signal and the reference path signal are generated from a time modulated signal beam as recited in claim 61. For at least these reasons Applicant submits that claims 66 and 67, which depend on base claim 61, are patentable over Debreczeny in view of Virtanen and further in view of Drevillon. According, Applicant respectfully requests that claims 66 and 67 be found allowable.

Final Comments

The application is believed to be in condition for allowance. Such allowance is respectfully requested.

In the event that there are any questions related to these amendments or to the application in general, the undersigned would appreciate the opportunity to address those questions directly in a telephone interview at 919-861-5092 to expedite the prosecution of this application for all concerned. If necessary, please consider this a Petition for Extension of Time to affect a timely response. Please charge any additional fees or credits to the account of Bose McKinney & Evans, LLP Deposit Account No. 02-3223.

Respectfully submitted,
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